

About Me (Reynolds Child Depression Scale)

Grade 3 / Year 4

Fast Track Project Technical Report

Stephanie Little & Grace Yan Fang

December, 2000

Table of Contents:

- I. Introduction
- II. Report Sample and Missing Data
- III. Scaling
- IV. Means, STDs and Differences Between Groups or Among Sites
- V. Recommendations for Use

I. Introduction

The Reynolds Child Depression Scale (RCDS, also called the 'About Me' questionnaire), was administered as part of the summer child interview for the first time in Year 4 of the Fast Track Project. The RCDS is a 30-item self-report measure of depressive symptoms developed by Reynolds (1989a, 1989b). The items assess symptoms of depression from the criteria listed from major depression and dysthymia in the Diagnostic and Statistical Manual of Mental Disorders-Third Edition-Revised (DSM-III-R; American Psychiatric Association). All but one of the items assesses clinically relevant depressive symptoms on a 4-point Likert-type scale, ranging from 1="almost never" to 4="all the time." (The items on the Fast Track scan form ranged from 0 to 3; thus, a constant of 1 was added to each of the item scores in order to make the scale similar to the original version). The last item consists of 4 (the original scale has 5) "smiley" faces ranging from sad to happy. Items 1, 5, 10, 12, 23, 25, and 30 were reversed scored so that higher scores on each item reflect higher levels of depressive symptoms. Item means, standard deviations, sample sizes, and factor loadings are listed in Table 1. These items were based upon the 340 subjects from the Normative sample who had at least some data from the About Me questionnaire.

II. Report Sample and Missing Data

Cohort 1 started at kindergarten stage in the school year 1990—1991. Across 4 sites there are total 618 children in cohort 1, including 310 children in the high-risk sample and 387 children in normative sample (some kids in the normative sample also qualified for high-risk status). In the longitudinal study, there are a total of 547 students at grade 3, including 340 students in the normative sample (including overlap) and 278 students in the high-risk sample. There is no value out of range — 0 to 3. Among grade 3 students, 71 students (11%) had missing responses for the entire questionnaire, including 47 normative students (12%, including overlap) and 32 high-risk students (10%). The unit non-respondents included 17 students from Durham, 13 students from Nashville, 15 students from Pennsylvania, and 26 students from Seattle, respectively. See details in the following chart, where 0 means subjects are missing the entire questionnaire, and 1 means subjects answered some questions.

Table of yr4 by SITE

Year4	SITE(Site Name)				Total
	DURH	NASH	PENN	WASH	
0	17	13	15	26	71
	2.75	2.10	2.43	4.21	11.49
	23.94	18.31	21.13	36.62	
	10.37	8.90	9.15	18.06	
1	147	133	149	118	547
	23.79	21.52	24.11	19.09	88.51
	26.87	24.31	27.24	21.57	
	89.63	91.10	90.85	81.94	
Total	164	146	164	144	618
	26.54	23.62	26.54	23.30	100.00

In addition, there are only 13 subjects who had missing items - missing responses for individual scale items. Detailed missing patterns are as following, where N in the 4th column stands for NORMAL sample. For missing items, single imputation was performed for each missing value. That is, missing items are replaced with the mean of non-missing items.

III. Scaling

The internal consistency reliability of the RCDS for normative sample, high-risk sample, pooled sample (normal + high-risk), and for various subsamples by 4 sites and by treatments, was computed using Cronbach's (1951) α . For the 30 items of the RCDS in the normative sample (Table 2), Cronbach's $\alpha = 0.87$, which implies a high level of internal consistency. Table 2 shows that reliability coefficients by sites were uniformly high and range from 0.83 to 0.90 in normative sample. A pattern of high internal consistency for children depression shown in Table 5 and 6 for all groups, ranging from 0.77 to 0.92 in high-risk group (Table 5), and ranging from 0.82 to 0.90 in pooled sample (Table 6). In addition, since the sample sizes for some of the control and treatment groups are small, the reliability coefficients should be interpreted cautiously.

Factor analyses of the 30-item have been performed to determine whether the depression measurement would cluster into several factors for 341 normative subjects. Prior to rotation, only two eigenvalues are greater than 1 -- $\lambda_1 = 6.29$ and $\lambda_2 = 1.46$, accounting for 82% of the total variance. Scree plot for determining the meaningfulness of the factors also suggests 2-factor structure. Thus, factor analysis identified 2 factors— factor 1 negative attitude and factor 2 positive attitude for normative sample based on oblique rotation. The 2nd factor consists of exactly all of the reversed items—item 1, 5, 10, 12, 23, 25 and 30. Thus, oblique rotation displays a clear 2-factor structure—negative and positive attitude, presented in Table 1. Orthogonal rotation lead to similar good results as with oblique rotation, but PROMAX—oblique rotation presents a clearer factor structure and is more interpretable. The PROMAX is almost always the preferred solution, because if the factor inter-correlation is 0, you end up with the same solution as the VARIMAX—orthogonal rotation. Virtually the same factor structure was found at grade 4 (year 5). Inter-factor correlation is 0.39 at grade 3 using PROMAX—oblique rotation, i.e. 2 factors are correlated.

The RCDS Professional Manual (Reynolds, 1989) presented preliminary findings of an orthogonal rotated five-factor solution to the RCDS, which is different from the present results. Different factor structures of RCDS and Fast track may be due to different questions on several items of RCDS and Fast track. Please note that the current results of factor analysis at grade 3 is different from the old technical report at grade 3 (year 4) written by Stephanie Little. Results of factor analyses in updated version are recommended.

When using a sum of the RCDS items, Reynolds recommends using a cut-off score of 74 as an indicator of clinically significant level of depressive symptomatology. Since the FAST Track dataset use the mean of all 30 items, instead of a sum, the equivalent cut-off score will be 2.47 (74/30). In the FAST Track normative sample, 22 subjects (6.47%) had RCDS mean scores equal to or greater than 2.47.

Table 1 depicts item means, standard deviations, sample sizes and factor loadings. These item means were obtained based upon 340 subjects from the normative sample who had 30 items for the About Me questionnaire after single imputation.

Table 1. Means, SD's and factor loadings of the RCDS (About Me) items: Normative sample

Variable	Label	N	Mean	Std Dev	Rotated Factor 1 loading	Rotated Factor 2 loading
C4GAM1	I feel happy	340	1.69	0.84		0.52
C4GAM2	I worry about school	340	2.12	1.10	0.40	
C4GAM3	I feel lonely	340	1.97	0.98	0.45	
C4GAM4	I feel my parents dont like me	340	1.38	0.78	0.37	
C4GAM5	I feel important	340	1.94	1.04		0.42
C4GAM6	I feel like hiding from people	340	1.84	1.01	0.53	
C4GAM7	I feel sad	340	1.84	0.81	0.53	
C4GAM8	I feel like crying	340	1.75	0.86	0.61	
C4GAM9	I feel that no one cares about me	340	1.53	0.87	0.59	
C4GAM1	I feel like playing with other kids	340	1.67	0.92		0.50
C4GAM1	I feel sick	340	1.85	0.87	0.57	
C4GAM1	I feel loved	340	1.51	0.85		0.48
C4GAM1	I feel like running away	340	1.43	0.80	0.38	
C4GAM1	I feel like hurting myself	340	1.39	0.75	0.46	
C4GAM1	I feel that other kids don't like me	340	1.67	0.88	0.43	
C4GAM1	I feel upset about things	340	1.86	0.79	0.56	
C4GAM1	I feel life is not fair	340	1.78	0.96	0.49	
C4GAM1	I feel tired	340	2.28	1.00	0.53	
C4GAM1	I feel I am bad	340	1.70	0.88	0.47	
C4GAM2	I feel I am no good	340	1.46	0.80	0.48	
C4GAM2	I have trouble paying attention i in class	340	1.72	0.94	0.38	
C4GAM2	I feel sorry for myself	340	1.62	0.88	0.54	
C4GAM2	I feel like talking to other kids	340	2.00	1.01		0.49
C4GAM2	I have trouble sleeping	340	2.11	1.10	0.39	
C4GAM2	I feel like having fun	340	1.56	0.88		0.35
C4GAM2	I feel worried	340	1.93	0.85	0.60	
C4GAM2	I get stomach aches	340	1.89	0.90	0.59	
C4GAM2	I feel bored	340	2.27	0.96	0.44	
C4GAM2	I feel like nothing I do helps anymore	340	1.70	0.95	0.53	
C4GAM3	Indicate how the child feels	340	1.45	0.67		0.44

IV. Means, SD's and Differences Between Groups or Among Sites

Upon the above analyses, as long as a child answered at least half (15) RCDS questions, a mean score of all RCDS items was calculated as an index of each subject's level of depressive symptomatology, based on single imputation results.

The use of a separate normal sample is an important consideration in scale construction. The normal sample has skewed distribution. To be consistent with the old technical report at grade 3 (year 4), Tables 1 to 6 are put in the same order. Comparison of the normal sample low-risk group and the high-risk control group is added in Table 7. Tables 1 to 4 depict normative sample characteristics. Table 5 is focused on the high-risk sample. Table 6 examines differences across sites within the total sample.

The mean score for the 340 individuals available from the normative sample, as well as means for each site, are displayed in Table 2, along with standard deviations, Cronbach's alphas and sample sizes. From ANOVA model, Table 2 displays no statistically significant different mean level of depressive symptoms among 4 sites. Duncan's multiple range tests show the same results among 4 sites.

However, Table 6 presents significant site differences in total sample (normal + high risk) using ANOVA model at the 0.05 level. The mean score in Durham site is significantly higher than that of Pennsylvania and Washington sites by Duncan's multiple range tests.

Table 3 lists mean RCDS scores for boys and girls separately by site. There is no significant gender difference on mean scores, at 0.05 level, in the total normative sample (Table 3). Gender difference for each site was not examined.

The normative sample may be considered reasonably racially heterogeneous, being composed of Caucasian (51%), African American (46%), Hispanic (1%), Native American (0.3%) and other race group (2%). African American have statistically significant higher levels of depressive symptomatology than Caucasian subjects, with $t=3.04$ and $p=0.003$ in pooled 4 sites normative sample (Table 4).

For the mean scores of the 30 items in Table 7, a t-test shows that there is no statistically significant difference at $\alpha=0.05$ level between normal sample low-risk group (the 387 normative subjects minus the controls) and high-risk control group (including normal sample high-risk subjects). The mean is higher in high-risk control group. Differences on each item are examined by t-tests between high-risk control group vs. normal sample low-risk group. Items 17 (I feel life is not fair) and 21 (I have trouble paying attention in class) are significantly different at $\alpha=0.05$ level. Both mean scores are higher in high-risk control group for above 2 items. These differences further suggest multidimensionality in the instrument.

V. Recommendations for Use

Any undefined values are treated as missing values, i.e. put all of previous item-imputations to missing. Four raw data sets—dc4g1.sd2, nc4g1.sd2, pc4g1.sd2 and sc4g1.sd2 already had single imputation for the 13 subjects who missed one item. Because the previous single imputations were NOT based on the "same direction" items, imputation by mean of non-missing items would not be appropriate and misleading. After reversing some items, the 30 items are in the same direction, with higher values standing for higher levels of depressive symptoms. Then single imputation is conducted using the mean of non-missing items for the 13 (= 1*12+2) missing data points. All of numbers in tables 1 to 7 are based on the results of single imputation. It is recommended that analysts carefully consider the construct of interest for the specific analysis before casually using the 30-item scale. Also, analysts should be aware of possible skewed distributional issues. The 30 items possess good reliability-high Cronbach's alpha. Based on the analyses performed for this report, it is suggested that 2 variables be created and retained from the Reynolds Child Depression Scale:

- 1) A means of all (30) RCDS items (as long as the subjects has data for at least 15 items). The variable name of this score for grade 3 (year 4) is: AME4MEA.
 - 2) A variable denoting whether or not the subject's mean RCDS score is in the clinically significant range. The variable name for his item will be: AME4DEP. where 0=RCDS not clinically significant (<2.47); 1=RCDS clinically significant (> 2.47).
- Results of factor analyses in updated version are recommended.

Table 2. Means, SD's and factor loadings of the RCDS (About Me) items: Normative sample

Sample	N	Mean	Std. Dev.	Reliability Coefficient
Total Normative	340	1.76	0.41	0.87
Durham	91	1.82	0.45	0.87
Nashville	89	1.79	0.37	0.83
Penn	87	1.69	0.41	0.90
Washington	73	1.74	0.42	0.90

Note: There is no significant site difference.

Table 3 Means and SD's for the mean of all RCDS items: Normative Sample boys and girls at each site

Site	Gender	N	Mean	Std. Dev.
Total Normative	Boys	174	1.77	0.40
	Girls	166	1.76	0.43
Durham	Boys	46	1.80	0.42
	Girls	45	1.85	0.47
Nashville	Boys	44	1.76	0.35
	Girls	45	1.83	0.40
Penn	Boys	43	1.74	0.38
	Girls	44	1.65	0.44
Washington	Boys	41	1.80	0.46
	Girls	32	1.67	0.35

Table 4. Means and SD's for the mean of all RCDS items: Caucasian and African American Normative subjects

Site	Race	N	Mean	Std. Dev.
Total Normative	Caucasian	174	1.70	0.39
	African American	155	1.84	0.44
Durham	Caucasian	10	1.62	0.23
	African American	81	1.85	0.46
Nashville	Caucasian	43	1.68	0.34
	African American	45	1.91	0.38
Penn	Caucasian	86	1.69	0.41
	African American	1	1.93	NA
Washington	Caucasian	35	1.78	0.40
	African American	28	1.70	0.46

Note: NA means not available, because of only 1 subject.

Table 5 Means, SD's and reliability coefficients for the mean of all RCDS items: High risk sample

Site	sample	N	Mean	Std. Dev.	Reliability Coefficient
All Sites	High Risk	278	1.82	0.43	0.86
	Control	138	1.83	0.44	0.87
Durham	High risk	68	1.94	0.45	0.85
	Control	34	1.90	0.44	0.86
Nashville	High risk	78	1.82	0.36	0.80
	Control	39	1.88	0.36	0.77
Penn	High risk	74	1.82	0.44	0.88
	Control	37	1.76	0.47	0.90
Washington	High risk	58	1.68	0.44	0.91
	Control	28	1.74	0.49	0.92

Table 6 Means, SD's and reliability coefficients for the mean of all RCDS items: All subjects (normative sample and high-risk sample combined)

Sample	N	Mean	Std. Dev.	Min.	Max.	Reliability Coefficient
All Subjects	547	1.78	0.42	1.00	3.30	0.87
Durham	147	1.87 ^a	0.46	1.07	3.30	0.87
Nashville	133	1.79 ^{ab}	0.37	1.10	2.90	0.82
Penn	149	1.74 ^b	0.43	1.00	3.13	0.89
Washington	118	1.71 ^b	0.42	1.03	2.93	0.90

Note: Means with different superscripts are significant different at 0.05 level and same superscripts stand for no significant difference using Duncan's multiple range test.

Table 7 Means, SD's of the RCDS (About Me) items: High Risk Control Group vs. Normal Sample Low-Risk Group

Group	N	Mean	Std. Dev.
High Risk Control Group (including normal sample high-risk subjects)	138	1.83	0.44
Normal Sample Low-Risk Group (the 387 normative subjects minus the controls)	269	1.74	0.42

References:

Reynolds, W. M. (1989a). *Reynolds Children Depression Scale: Professional Manual*. Psychological Assessment Resources.

Stephanie Little, Fast Track Project technical report, *Reynolds Children Depression Scale*, May 1995 (year 4)